

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claims 1-29 (cancelled)

2

1 Claim 30 (currently amended): ~~Device according to claim~~
2 29, Device for the optical excitation of laser-active
3 crystals, with a diode laser (1) which generates pump
4 radiation (2), the laser-active crystal being arranged in
5 a solid-state laser or solid-state laser amplifier and
6 the laser-active crystal having an axis (C) with strong
7 absorption and an axis (A) with weak absorption,
8 comprising: an optical element (4) is arranged downstream
9 of the diode laser (1) in order to achieve spatial
10 shaping of the pump radiation from the diode laser (1)
11 and in that the pump radiation (2) from the diode laser
12 (1) is substantially polarised linearly in a privileged
13 polarisation direction, and in that the polarisation
14 direction of the pump radiation (2) is oriented parallel
15 to the weak-absorption axis (A) of the laser-active
16 crystal (14) when it is incident in the laser-active
17 crystal (14); and

18 wherein the laser-active crystal (14) has at least a
19 first and a second end face (14a, 14b) which have a
20 polarisation-dependent transmission, and in that the
21 polarisation direction of the pump radiation (2) is
22 oriented so that the reflection losses at the first or
23 second end faces (14a, 14b) are minimal and the optical
24 power which enters the laser-active crystal (14) is
25 maximal.

1 Claim 31 (currently amended): ~~Device according to claim~~
2 ~~29,~~ Device for the optical excitation of laser-active
3 crystals, with a diode laser (1) which generates pump
4 radiation (2), the laser-active crystal being arranged in
5 a solid-state laser or solid-state laser amplifier and
6 the laser-active crystal having an axis (C) with strong
7 absorption and an axis (A) with weak absorption,
8 comprising: an optical element (4) is arranged downstream
9 of the diode laser (1) in order to achieve spatial
10 shaping of the pump radiation from the diode laser (1)
11 and in that the pump radiation (2) from the diode laser
12 (1) is substantially polarised linearly in a privileged
13 polarisation direction, and in that the polarisation
14 direction of the pump radiation (2) is oriented parallel
15 to the weak-absorption axis (A) of the laser-active
16 crystal (14) when it is incident in the laser-active
17 crystal (14); and
18 _____ wherein the solid-state laser or solid-state laser
19 amplifier comprises a laser resonator (27) with a
20 multiplicity of mirrors (28, 29, 30), the surfaces of
21 which are provided with polarisation-dependent
22 transmission, and in that the polarisation direction of
23 the pump radiation (2) is oriented so that the reflection
24 losses at these surfaces are minimal and the optical
25 power which enters the laser-active crystal (14) is
26 maximal.

1 Claim 32 (currently amended): Device according to claim
2 ~~29~~ 31, wherein the laser-active crystal (14) consists of
3 Nd:YVO₄, Nd:GdVO₄, Nd:LSB, Nd:YAlO₃, Nd:YLF or Nd:BEL.

1 Claim 33 (currently amended): Device according to claim
2 ~~29~~ 31, wherein the laser-active crystal (14) consists of
3 Nd:YVO₄ with neodymium doping of more than 0.5% (at.).

1 Claim 34 (currently amended): Device according to claim
2 ~~29~~ 31, wherein the optical element (4) is configured in
3 the form of micro-optics.

1 Claim 35 (currently amended): ~~Device according to claim~~
2 ~~29, Device for the optical excitation of laser-active~~
3 ~~crystals, with a diode laser (1) which generates pump~~
4 ~~radiation (2), the laser-active crystal being arranged in~~
5 ~~a solid-state laser or solid-state laser amplifier and~~
6 ~~the laser-active crystal having an axis (C) with strong~~
7 ~~absorption and an axis (A) with weak absorption,~~
8 ~~comprising: an optical element (4) is arranged downstream~~
9 ~~of the diode laser (1) in order to achieve spatial~~
10 ~~shaping of the pump radiation from the diode laser (1)~~
11 ~~and in that the pump radiation (2) from the diode laser~~
12 ~~(1) is substantially polarised linearly in a privileged~~
13 ~~polarisation direction, and in that the polarisation~~
14 ~~direction of the pump radiation (2) is oriented parallel~~
15 ~~to the weak-absorption axis (A) of the laser-active~~
16 ~~crystal (14) when it is incident in the laser-active~~
17 ~~crystal (14); and~~

18 wherein the optical element (4) is designed in the
19 form of a polarisation-preserving waveguide, in order to
20 achieve spatial shaping of the pump radiation (2) from
21 the diode laser (1), the polarisation-dependent waveguide
22 consisting, for example, of a glass rod or an optical
23 fibre.

1 Claims 36-38 (canceled):

1 Claim 39 (currently amended): ~~Device according to claim~~
2 ~~38,~~ Device for the optical excitation of laser-active
3 crystals, with a diode laser (1) which generates pump
4 radiation (2), the laser-active crystal being arranged in
5 a solid-state laser or solid-state laser amplifier and
6 the laser-active crystal having an axis (C) with strong
7 absorption and an axis (A) with weak absorption,
8 comprising: an optical element (4) is arranged downstream
9 of the diode laser (1) in order to achieve spatial
10 shaping of the pump radiation from the diode laser (1)
11 and in that the pump radiation (2) from the diode laser
12 (1) is substantially polarised linearly in a privileged
13 polarisation direction, and in that the polarisation
14 direction of the pump radiation (2) is oriented parallel
15 to the weak-absorption axis (A) of the laser-active
16 crystal (14) when it is incident in the laser-active
17 crystal (14);

18 wherein the second end face (14b) of the laser-
19 active crystal (14) is assigned a reflector (52), which
20 reflects the unabsorbed pump radiation (50) that was
21 injected through the first end face (14a), and injects it
22 into the second end face (14b) as reflected pump
23 radiation (54); and

24 wherein the laser-active crystal (14) has doping and
25 a length which are selected so that less than 70% of the
26 pump radiation (2) can be absorbed in the laser-active
27 crystal (14) after entering through the first end face
28 (14a).

1 Claim 40 (previously presented): Device according to
2 claim 39, wherein approximately 50 to 60% of the pump
3 radiation (2) can be absorbed in the laser-active crystal
4 (14) after entering through the first end face (14a).

1 Claim 41-44 (canceled):

1 Claim 45 (currently amended): ~~Method according to claim~~
2 ~~43,~~ Method for the optical excitation of laser-active
3 crystals with a diode laser (1), the laser-active crystal
4 (14) being arranged in a solid-state laser or solid-state
5 laser amplifier, comprising:
6 - spatially shaping pump radiation (2) generated by the
7 diode laser (1) with an optical element (4), the shaped
8 pump radiation (2) having a polarisation direction, and
9 - projection onto a laser-active crystal (14), which has
10 an axis (C) with strong absorption and an axis (A) with
11 weak absorption, so that the polarisation direction of
12 the pump radiation (2) is oriented parallel to the weak-
13 absorption axis (A) of the laser-active crystal (14); and
14 wherein the laser-active crystal (14) has at least a
15 first and a second end face (14a, 14b) which have a
16 polarisation-dependent transmission, and in that the
17 polarisation direction of the pump radiation (2) is
18 oriented so that the reflection losses at the first or
19 second end faces (14a, 14b) are minimal and the optical
20 power which enters the laser-active crystal (14) is
21 maximal.

1 Claim 46 (currently amended): ~~Method according to claim~~
2 ~~43,~~ Method for the optical excitation of laser-active
3 crystals with a diode laser (1), the laser-active crystal

4 (14) being arranged in a solid-state laser or solid-state
5 laser amplifier, comprising:
6 - spatially shaping pump radiation (2) generated by the
7 diode laser (1) with an optical element (4), the shaped
8 pump radiation (2) having a polarisation direction, and
9 - projection onto a laser-active crystal (14), which has
10 an axis (C) with strong absorption and an axis (A) with
11 weak absorption, so that the polarisation direction of
12 the pump radiation (2) is oriented parallel to the weak-
13 absorption axis (A) of the laser-active crystal (14); and
14 wherein the solid-state laser or solid-state laser
15 amplifier comprises a laser resonator (27) with a
16 multiplicity of mirrors (28, 29, 30), the surfaces of
17 which are provided with polarisation-dependent
18 transmission, and in that the polarisation direction of
19 the pump radiation (2) is oriented so that the reflection
20 losses at these surfaces are minimal and the optical
21 power which enters the laser-active crystal (14) is
22 maximal.

1 Claim 47 (currently amended): Method according to claim
2 43 46, wherein the laser-active crystal (14) consists of
3 Nd:YVO₄, Nd:GdVO₄, Nd:LSB, Nd:YA10₃, Nd:YLF or Nd:BEL.

1 Claim 48 (currently amended): Method according to claim
2 43 46, wherein the laser-active crystal (14) consists of
3 Nd:YVO₄ with neodymium doping of more than 0.5% (at.).

1 Claims 49-50 (canceled):

1 Claim 51 (currently amended): ~~Method according to claim~~
2 ~~50~~, Method for the optical excitation of laser-active

3 crystals with a diode laser (1), the laser-active crystal
4 (14) being arranged in a solid-state laser or solid-state
5 laser amplifier, comprising:

6 - spatially shaping pump radiation (2) generated by the
7 diode laser (1) with an optical element (4), the shaped
8 pump radiation (2) having a polarisation direction, and
9 - projection onto a laser-active crystal (14), which has
10 an axis (C) with strong absorption and an axis (A) with
11 weak absorption, so that the polarisation direction of
12 the pump radiation (2) is oriented parallel to the weak-
13 absorption axis (A) of the laser-active crystal (14);

14 wherein pump radiation (52) emerging from the second
15 end face (14b) of the laser-active crystal (14) is
16 reflected by a reflector (52), and re-enters the laser-
17 active crystal (14) as reflected pump radiation (54)
18 through the second end face (14b); and

19 wherein the laser-active crystal (14) has doping and
20 a length which are selected so that less than 70% of the
21 pump radiation (2) can be absorbed in the laser-active
22 crystal (14) after entering through the first end face
23 (14a).

1 Claim 52 (previously presented): Method according to
2 claim 51, wherein approximately 50 to 60% of the pump
3 radiation (2) is absorbed in the laser-active crystal
4 (14) after entering through the first end face (14a).

Claim 53-54 (canceled):